

1 IN THE CLAIMS:

2

3

4 Claims 1-6 as are currently pending in this case appear
5 below:
6

7 Claim 1 (Previously Amended). An apparatus comprising
8 an electrically heated composite umbilical means installed
9 within a subsea flowline containing produced hydrocarbons as
10 an immersion heater means to prevent waxes and hydrates from
11 forming within said flowline and blocking said flowline,
12 whereby said electrically heated composite umbilical means
13 possesses at least one electrical conductor disposed within
14 said composite umbilical means that conducts electrical
15 current that is used to heat said electrically heated
16 composite umbilical means within said subsea flowline,
17 whereby said electrical conductor is surrounded by a
18 composite material, and whereby said composite material is
19 comprised of fibers of high strength embedded in a matrix
20 material, whereby said fibers are selected from carbon
21 fibers, aramid fibers and glass fibers, and whereby said
22 matrix material is selected from thermoset resins and
23 thermoplastic resins, whereby said thermoset resins include
24 epoxy and vinyl ester, and whereby said thermoplastic resins
25 include PEEK, PEKK, and nylon.

26

27

28 Claim 2 (Previously Amended). A method of installing
29 an electrically heated composite umbilical means within a
30 previously existing subsea flowline containing produced
31 hydrocarbons to make an immersion heater means to prevent
32 waxes and hydrates from forming within said flowline and
33 blocking said flowline, whereby said electrically heated

"RESPONSE TO OFFICE ACTION
MAILED 7/14/2005"
Serial No. 10/729,509
Rig-2

1 composite umbilical means possesses at least one electrical
2 conductor disposed within said composite umbilical means that
3 conducts electrical current that is used to heat said
4 electrically heated composite umbilical means, whereby said
5 electrical conductor is surrounded by a composite material,
6 and whereby said composite material is comprised of fibers of
7 high strength embedded in a matrix material, whereby said
8 fibers include carbon fibers, aramid fibers and glass fibers,
9 and whereby said matrix material includes thermoset resins
10 and thermoplastic resins, whereby said thermoset resins
11 include epoxy and vinyl ester, and whereby said thermoplastic
12 resins include PEEK, PEKK, and nylon.

13
14

15 Claim 3 (Previously Amended). A method of using an
16 umbilical conveyance means to convey into an existing subsea
17 flowline possessing produced hydrocarbons an electrically
18 heated composite umbilical means used as an immersion heating
19 means to prevent waxes and hydrates from forming within said
20 flowline and blocking said flowline, whereby said
21 electrically heated composite umbilical means possesses at
22 least one electrical conductor disposed within said composite
23 umbilical means that conducts electrical current that is used
24 to heat said electrically heated composite umbilical means,
25 whereby said electrical conductor is surrounded by a
26 composite material, and whereby said composite material is
27 comprised of fibers of high strength embedded in a matrix
28 material, whereby said fibers include carbon fibers, aramid
29 fibers and glass fibers, and whereby said matrix material
30 includes thermoset resins and thermoplastic resins, whereby
31 said thermoset resins include epoxy and vinyl ester, and
32 whereby said thermoplastic resins include PEEK, PEKK,
33 and nylon.

"RESPONSE TO OFFICE ACTION
MAILED 7/14/2005"
Serial No. 10/729,509
Rig-2

1 Claim 4 (Previously Amended). A method of using an
2 umbilical conveyance means to convey into an existing subsea
3 flowline containing produced hydrocarbons an electrically
4 heated umbilical means used as an immersion heating means to
5 prevent waxes and hydrates from forming within said flowline
6 and blocking said flowline, whereby said electrically heated
7 composite umbilical means possesses at least one electrical
8 conductor disposed within said composite umbilical means that
9 conducts electrical current that is used to heat said
10 electrically heated composite umbilical means, whereby said
11 electrical conductor is surrounded by a composite material,
12 and whereby said composite material is comprised of fibers of
13 high strength embedded in a matrix material, whereby said
14 fibers include carbon fibers, aramid fibers and glass fibers,
15 and whereby said matrix material includes thermoset resins
16 and thermoplastic resins, whereby said thermoset resins
17 include epoxy and vinyl ester, and whereby said thermoplastic
18 resins include PEEK, PEKK, and nylon.

19

20

21 Claim 5. (Original) A method of providing artificial
22 lift to produced hydrocarbons within a subsea flowline
23 comprising at least the steps of:

24 (a) attaching a progressing cavity pump to an electric
25 motor to make an electrically energized pump;

26 (b) attaching said electrically energized pump to
27 to a first end of a tubular composite umbilical possessing a
28 multiplicity of electrical conductors within the wall of said
29 tubular composite umbilical;

30 (c) conveying into said flowline said electrically
31 energized pump attached to said first end of said composite
32 tubular umbilical;

33 (d) using first and second of said multiplicity of

"RESPONSE TO OFFICE ACTION
MAILED 7/14/2005"
Serial No. 10/729,509
Rig-2

1 electrical conductors to electrically heat said composite
2 umbilical to prevent waxes and hydrates from blocking the
3 flow of said produced hydrocarbons within said flowline; and
4 (e) using at least third and fourth electrical
5 conductors of said multiplicity of electrical conductors to
6 provide electrical energy to said electrically energized
7 pump, whereby said progressing cavity pump provides
8 artificial lift to said produced hydrocarbons within said
9 subsea flowline.

10

11

12 Claim 6. (Original) A method of providing artificial
13 lift to produced hydrocarbons within a subsea flowline
14 comprising at least the steps of:

15 (a) attaching a hydraulic pump to an electric motor to
16 make an electrically energized pump;

17 (b) attaching said electrically energized pump to
18 to a first end of a tubular composite umbilical possessing a
19 multiplicity of electrical conductors within the wall of said
20 tubular composite umbilical;

21 (c) conveying into said flowline said electrically
22 energized pump attached to said first end of said composite
23 tubular umbilical;

24 (d) using first and second of said multiplicity of
25 electrical conductors to electrically heat said composite
26 umbilical to prevent waxes and hydrates from blocking the
27 flow of said produced hydrocarbons within said flowline; and

28 (e) using at least third and fourth electrical
29 conductors of said multiplicity of electrical conductors to
30 provide electrical energy to said electrically energized
31 pump, whereby said electrically energized pump provides
32 artificial lift to said produced hydrocarbons within said
33 subsea flowline.

"RESPONSE TO OFFICE ACTION
MAILED 7/14/2005"
Serial No. 10/729,509
Rig-2